Claims

[c1] 1.A method for objectively monitoring a noise level occurring in a product during use comprising the steps of:
imparting energy to the product to simulate an in use condition of the product;
measuring the sound emitted from the product;
establishing a threshold metric ;
generating an objective metric based on the measured sound;
comparing the objective metric with the threshold metric; and
generating feedback, the feedback including information relating to the comparison of the objective metric and the threshold metric.

[c2] 2.A method for objectively monitoring a noise level as set forth in claim 1 including the steps of:
determining when the objective metric exceeds threshold metric;
when the objective metric exceeds the threshold metric subjectively evaluating the noise emitted from the product to diagnose the reason for the objective metric exceeding the threshold metric; and
performing any repairs necessary to the product such that the noise level of the product meets acceptable noise level standards.

[c3] 3.A method for objectively monitoring a noise level as set forth in claim 1 wherein the step of generating an objective metric based on the measured sound includes the steps of acquiring sound data for a defined time period; and computing an objective metric based on an N10 loudness scale from the acquired sound data.

[c4] 4.A method for objectively monitoring a noise level as set forth in claim 1 wherein the step of establishing a threshold metric includes the steps of:
selecting a product that meets allowable noise level standards and measuring the sound level of said selected product; and
using the measured sound level of the selected product to compute a threshold metric based on an N10 loudness scale.

[c5] 5.A method for objectively monitoring a noise level as set forth in claim 1 including the steps of:

saving information related to the objective metric and the threshold metric;
performing statistical processing based on the saved information; and
preparing reports based on the saved information.

[c6] 6.A method for objectively monitoring a noise level as set forth in claim 2 including the step of preparing at least one report as part of the step of generating feedback, said report providing information relating to repair information.

[c7] 7. A method for objectively monitoring the noise level as set forth in claim 1 including the steps of:
documenting any diagnosis and repair relating to the product;
determining the most common cause of noise in the product; and
providing possible suggestions to improve the product by reducing overall noise levels.

[c8] 8.A method for objectively monitoring a noise level as set forth in claim 2 including the step of documenting, using a standardized as of comments and descriptors, the cause of the noise and any necessary repairs to the product.

[c9] 9.A method for objectively monitoring a noise level as set forth in claim 8 wherein the standardized list corresponds to known warranty code parameters.

[c10] 10.A method for objectively monitoring the sound level of vibration induced sounds on a vehicle comprising the steps of:
placing a sound recording instrument in a position with respect to the vehicle to record sound emitted from the vehicle;
connecting the sound recording instrument to a data acquisition apparatus;
vibrating the vehicle and using the data acquisition apparatus to record the vibration induced sound;
measuring the level of the vibration induced sound and computing an objective metric; and
comparing the objective metric with a threshold metric.

[c11] 11.A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 10 wherein the objective metric and the threshold

metric are based on a N10 loudness scale.

[c12] 12.A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 10 wherein said step of comparing the objective metric with a threshold metric includes the steps of:
evaluating the comparison of the objective metric with the threshold metric to determine whether the vibration induced sound level in the vehicle is unacceptable;
when the evaluation indicates that the sound level is unacceptable, diagnosing the vehicle to determine the source of the unacceptable sound level;
performing an appropriate repair; and
confirming that the unacceptable sound level is no longer present.

[c13] 13.A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the step ofdocumenting the diagnosis and repair.

[c14] 14.A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the step of using a graphical user interface and standardized list of descriptors to input into the data acquisition apparatus information pertaining to the diagnosis and repair.

[c15] 15.A method for objectively monitoring the level of vibration induced sounds on a vehicle as set forth in claim 13 including the step of inputting into the data acquisition apparatus information pertaining to the diagnosis and repair.

[c16] 16.A method of objectively monitoring the level out of vibration induced sound on a vehicle as set forth in claim 12 including the steps of:
saving data relating to each vehicle tested including, the objective metric, threshold metric, and any diagnosis and repair; and
performing a statistical analysis on the saved data.

[c17] 17.A method for objectively monitoring the level of vibration induced sound on a vehicle as set forth in claim 12 including the steps of:
saving data relating to each vehicle tested including, the objective metric, threshold metric, and any diagnosis and repair.

performing statistical processing on the saved data;
generating feedback based on the statistical processing;
reviewing the feedback to determine repair information; and
using said feedback to develop corrective action to reduce the level of vibration induced sound.

[c18] 18.A method of objectively monitoring the sound level occurring in a vehicle during operation comprising the steps of:
placing a sound recording instrument within the vehicle;
connecting sound recording instrument to a data acquisition apparatus;
measuring and recording the sound level emitted from the vehicle during operation;
computing an objective metric based on the recorded sound level;
subjectively evaluating the vehicle to determine the source of the sound emitted from the vehicle when the objective metric exceeds a threshold metric; and
if necessary, repairing the vehicle to reduce the sound to an acceptable level.

[c19] 19.A method of objectively monitoring the sound level occurring in a vehicle during operation as set forth in claim 18 wherein the objective metric and the threshold metric are based on a N10 loudness scale.

[c20] 20.A method of objectively monitoring the sound level occurring in a vehicle during operation as set forth in claim 18 including the steps of:
documenting the evaluation and repair;
saving data relating to each vehicle tested including, the recorded sound level, the objective metric, threshold metric, the evaluation and any repair;
performing statistical processing on the saved data;
generating feedback information based on the statistical processing; and
using said feedback to develop corrective action to reduce the sound level in the vehicle.